SINTESIS PASIR KUARSA (SiO_2) TERLAPISI *SIMONKOLLEITE* ($Zn_5(OH)_8Cl_2.H_2O$) MENGGUNAKAN METODE SOL GEL

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ABSTRAK

Telah dilakukan sintesis pasir kuarsa (SiO_2) terlapisi *simonkolleite* ($Zn_5(OH)_8Cl_2.H_2O$) menggunakan metode sol-gel. Penelitian ini bertujuan untuk mengkaji pengaruh penambahan $ZnCl_2$ terhadap karakter fisikokimia dan menentukan karakter kuarsa terlapisi *simonkolleite*. Penelitian ini dilatarbelakangi oleh perlunya peningkatan efektivitas kuarsa dalam berinteraksi dengan berbagai ion logam sehingga perlu dilapisi dengan jenis zink yang memiliki situs aktif dan dapat meningkatkan luas permukaan.

Penelitian dilakukan dengan mereaksikan pasir kuarsa dengan $ZnCl_2$ (0,5; 0,7; 1; 2 dan 4M) dilanjutkan mereaksikannya dengan 50ml NaOH. Material awal dan hasil sintesis dianalisis kristalinitasnya dengan *X-ray diffraction* (XRD). Karakterisasi diperkuat dengan analisis ikatan silanol dan siloksan menggunakan *Fourier Transform Infrared Spectrometer* (FTIR) serta komposisi penyusun material dengan *X-ray Fluorescence* (XRF). Karakter fisikokimia pasir kuarsa dan hasil sintesis dianalisis *Surface Area Analyzer* (SAA), *Scanning Electron Microscope-Energy Dispersive X-ray* (SEM-EDX) dan nilai keasaman.

Hasil penelitian menunjukkan bahwa pasir kuarsa berhasil dilapisi. Kuarsa ditunjukkan puncak difraksi utama pada (2θ) 26,64^o . Ikatan Si-O-Si dan Si-OH pada puncak serapan 1100 cm^{-1} dan 800 cm^{-1} sedangkan kandungan Si: 39,96% dan O: 51,65%. *Simonkolleite* salutan ditunjukkan oleh puncak difraksi utama pada (2θ) 16,56^o; 22,075^o; 22,54^o dan 24,83^o. Keberhasilan dilapisi ditunjukkan adanya ikatan Si-O-Zn dan Zn-O dari puncak serapan 913,33 cm^{-1} dan 429 cm^{-1}. Pelapisan optimum *simonkolleite* terjadi pada konsentrasi 2M dengan kristalinitas mencapai 94,56%, kandungan Zn sebesar 72,86%, luas permukaan 17,24 m^2/g dan nilai keasamaan 5,69±0,69mmol/g.

Kata kunci: Pasir kuarsa, *simonkolleite*, dan pelapisan.

COATING QUARTZ SAND (SiO_2) WITH *SIMONKOLLEITE* ($Zn_5(OH)_8Cl_2.H_2O$) USING SOL-GEL METHOD

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ABSTRACT

Coating of quartz sand (SiO_2) with *simonkolleite* ($Zn_5(OH)_8Cl_2.H_2O$) using sol-gel method has been done. The aims of this research are to examine the effect of adding $ZnCl_2$ to physicochemical characters and to determine the quartz coated with *simonkolleite*. This research is motivated by the need to increase the effectiveness of quartz sand in interacting with various metal ions so it needs to be coated with zink species that have active sites on a wide surface.

The research was conducted by varying the concentration of $ZnCl_2$ by 0,5; 0,7; 1; 2 and 4M on quartz sand followed by reacthan units 50ml NaOH. The crystallinity of raw material and coating result were analyzed by X-ray diffraction (XRD). Moreover, the material characterized with Fourier Transform Infrared Spectrometer (FTIR) to analysis of silanol and siloxane bonds. The composition of the material was analyzed by X-ray Fluorescence (XRF). The physicochemical characteristics of quartz sand and the salutan results were analyzed by Surface Area Analyzer (SAA), Scanning Electron Microscope-Energy Dispersive X-ray (SEM-EDX) and acidity value.

The results show that quartz was successfully coated with *simonkolleite*. Quartz shown the main diffraction peak at (2θ) 26,64^o. Si-O-Si and Si-OH bonds at the absorption peak of 1100 cm^{-1} and 800 cm^{-1} while Si content: 39,96% and O: 51,65%. *Simonkolleite* is shown by the main diffraction peak at (2θ) 16,56 ^{o}; 22,07 ^{o}; 22,54 ^{o} and 24,82 ^{o}. The salutan of quartz with *simonkolleite* was indicated by absorption peaks of 913,33 cm^{-1} and 429 cm^{-1} of Si-O-Zn and Zn-O bonds. Optimum salutan *simonkolleite* occurred at concentration 2M with crystallinity 94,56%, Zn content equal to 72,86%, surface area 17,24 m^2/g and equal value 5,69±0,69 mmol/g.

Keyword: Quartz sand, *simonkolleite*, and coating.